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ABSTRACT

Due to demographic changes and trends now in progress graduate education delivery systems for students, teachers, and support providers will all be different in the future. Demographics will be the engine of change and the change itself will come rapidly as countries take steps to maintain and expand competitive skills in their work forces. There will be an increase in graduate courses offered through distance education and more older and minority students in gradate study. Research universities can increase graduate student enrollment by enhancing undergraduate teaching and advising. Demographic data indicates an imminent shortage of students starting graduate studies. Research on interest in graduate study among working people found that student financial support was a key to moderating shortfalls in doctoral starts. Birth cohort trends may bring a return to enrollment "normalcy" sometime in the first quarter of the next century. However, future economic shifts will affect birth cohort size. The Life Chance Theory suggests that young people facing uncertain economic futures postpone marriage and child bearing and birth cohorts are smaller. This demographic cycle is beyond the control of educational institutions. They must find ways to adjust by tapping new markets and working on retention. (JB)

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SHAPING GRADUATE EDUCATION'S FUTURE: IMPLICATIONS OF DEMOGRAPHIC SHIFTS FOR THE 21ST CENTURY

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Good morning. I am William F. Brazziel of the University of Connecticut. My colleagues and I will discuss scenarios of graduate education in the coming years, all of which will derive from demographic shifts, both past and future.

Dr. Anne Cirasa-Parish of Suffolk University will discuss senarios related to doctoral and master's starts along with some of the new delivery systems for graduate programs in business. Dr. Karl Beeler of the University of Missouri at St. Louis will discuss the promise of improved student services, improved program coherence and advisement, and expanded financial support in moderating projected shortfalls in degree production.

Summaries of our remarks will be shared with you as we speak. We intend to present our remarks with dispatch and thus leave ample time for questions and discussion.

Delivery systems for graduate education will be different in the years to come and so will the students, the teachers and the providers of support for graduate study.

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SUMMARY of remarks of a panel discussion at the Annual Conference of the Canadian Society for the Study of Higher Education, Ottawa, Canada, June 10-12, 1993

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Changing demographics will be the engine of change here and the change itself will come rapidly as countries take steps to maintain, and expand, competitive skills in their workforces. We shall see an increase in graduate courses offered through distance education.

Degrees offered through this medium will also increase. A prime example of an operation which is likely to be replicated is the National Technological University of Fort Collins, Colorado where an engineering master's degree is now delivered to engineers at 400 corporations, none of whom ever come to a campus. The curriculum and examinations are loaded down to computers, VCRs and, on occasion, live television, via satellite. Older students in similar settings who cannot leave their jobs for campus participation in master's study will comprise the prime markets for focused, bottom-line delivery systems of this type.

We shall see more and more older students in graduate study in all fields. By the year 2000, older students will comprise the majority of undergraduates in colleges and universities in America (the USA). They now comprise about 43 percent. They may very well comprise the bulk of baccalaureate recipients. They now comprise over 30 percent. Older students (and graduates) are defined as people who did, or will, complete a baccalaureate at age 25 and older.

We shall see more minority students in graduate education as the years go by. In America, more are receiving baccalaureates from colleges and universities and they are comprising larger and larger portions of the population. It is now recognized that America must utilize minority talent more fully if the country is to

continue to succeed in a global economy. This is especially true in science and engineering where American citizens now receive a decreasing share of Ph.D. degrees. In response to this development, the National Science Foundation and the U.S. Department of Education have mounted Minority Initiatives designed to increase the numbers of minorities going on to doctoral study in these fields.

More providers of graduate study will populate the scene in the 21st century. In addition to replications of the free-standing master's program of the National Technological University, we shall see more corporations replicating the graduate master's programs of the Arthur D. Little Corporation and the doctoral program of the Rand Corporation. Replications of the United States Air Force Institute of Technology and the Naval Postgraduate School will likely join the list of doctorate granting institutions.

We shall see another influx of veterans into colleges and universities, many of whom will enter graduate study. This influx will derive from efforts to downsize the armed forces and will involve well-educated individuals from the officer corps who must develop second careers as civilians.

According to Peter Syverson, director of research for the Council of Graduate Schools, innovation will be the order of the day in graduate education in the 21st century and master's education will comprise the crucible of innovation. Most of the growing numbers of older students in graduate education and most of the minorities - indeed, most of the new students as well as most of the expansion in the numbers of regular students will be at the master's level. The fastest growing

degree program in the country, for example, is the Executive MBA program. Corporations now underwrite fast track study for a fortunate few in these programs. The programs involve weekend study and sometimes on-site instruction. Dr.Cirasa-Parish will dwell on these new delivery systems for the degree in her remarks.

The changes in graduate education in the 21st century will involve changes in the organization and delivery of both graduate and undergraduate instruction. The latter is vitally important if the steady decrease in doctorate production among American citizens is to be reversed. A study set for release by the Higher Education Research Institute of UCLA notes that poor teaching and advising in major research universities turn off many prospective science and engineering graduate students and send them into other fields. The study was supported by the National Science Foundation. The authors noted that the schools routinely enroll freshmen with the highest measured ability in science and engineering in the country and, just as routinely, "underproduce" in numbers of graduates going on to the Ph.D. in science and engineering. On the other hand, many liberal arts colleges "overproduce" eventual doctorate recipients in these fields. Professors, as opposed to graduate assistants, in these schools teach freshmen and sophomores, identify talented students and mentor them into graduate study in science and engineering.

Some research universities are taking note and trying to improve teaching, advising and mentoring. Central office administrators and most of the chemistry

department at Rutgers University, for example, recently spent a week or so observing teaching techniques and delivery modes of this subject at a mostly black university in New Orleans (Xavier), a school which regularly "overproduces" eventual recipients of science and engineering doctorates and degrees in medicine, dentistry and pharmacy. Changes were made in how things were done at Rutgers and minority student grades in chemistry improved markedly. So did the numbers continuing on to doctoral study.

In this vein, efforts are underway to mentor more community and junior college students into graduate programs. Over half of all college students in America now begin their baccalaureate careers in JUCOs as the schools are called. The important predoctoral advising and mentoring must begin in these schools for many talented students. The potential is there. A recent National Science Foundation study of minority science and engineering doctorate recipients, completed by Marian Brazziel Associates (1993), found that 10 percent of the recipients over the last ten years began college in a JUCO. This ratio rose to 17 percent for older students, who are heavily represented among JUCO student populations. Susan Hill (1992), an NSF researcher, found that 10 percent of all science and engineering doctorates in 1991 were JUCO products.

Analysis of demographic data by our group graphically highlights the urgency of finding new sources of doctoral starts. Serious shortages loom due to demographic shifts, most stemming from the baby bust years. To illustrate: 25 year-old doctoral starts in 2000 will have been born in 1975, and will comprise

members of the second smallest cohort of the baby-bust years. See Appendix table for perusal of cohort sizes in American for the past 65 years.

Doctoral starts translate into doctoral recipients and doctoral recipients translate into the technology and know-how that any country needs to stay abreast in the stout global competition now facing it. Lack of starts translates into second and third rate economic status. Simply put, scientific nations must have a steady supply of scientists and engineers to survive and America is now at risk in this respect. Charles Vest (1992) noted recently that we will enter the 21st century with a deficit of 700,000 scientific and engineering workers, and that "if someone doesn't do something," things will get worse. Vest is president of the Massachusetts Institute of Technology. William Bowen, former president of Princeton University, recently completed a study which concluded that America's present corps of college professors cannot be replaced when they retire. According to Bowen, less than eight-tenths of an applicant will be available for each vacancy in the humanities and less than half an applicant will be available for each science vacancy (Bowen and Sosa, 1989).

In the NSF study mentioned above (Marian Brazziel Associates), interviewers found a sizeable number of newly hired minority corporate professionals who were desirous of returning to the campus to complete a Ph.D. in science or engineering. The interviewees noted that they were "out of the loop" as far as information about scholarships and fellowships for doctoral study was concerned. They urged remedial measures in this respect. Non-minority corporate hires have yet to be

interviewed, the message would probably be the same, however. Many very bright graduates take jobs on receipt of their baccalaureates instead of continuing on to graduate school. Most cite the need to pay off loans. Or to keep them from becoming larger and more forbidding. Most lose contact with the professors "in the loop," the individuals who comprise the network through which information about assistantships and fellowships is transmitted. For the lack of this nail - maintenance of the "loop" - many good doctoral starts are lost. The "loop" will surely find a prominent place on the agenda of those mounting initiatives designed to deal with shortfalls in starts in the coming years.

In the same study, interviewers found keen interest in doctoral study among a significant number of young people serving in the Community College of the Air Force and in the Project Ahead Colleges of the U.S. Army. Indeed, investigators found more than a handful of these young people who had enrolled in baccalaureate programs on campuses around the country upon leaving the armed services. Most had doctoral study in science or engineering high on their lists of priorities. Those mounting initiatives to deal with doctoral starts in the coming years may well reach out to these young people and they may do so as soon as they are able to reach them. Innovative outreach programs with military bases would afford the necessary contacts with these individuals. As noted above, the military will be downsizing and many high level members of the officer corps will be forced to seek other careers. Many will opt for doctoral training - if funds are available to reach out to them and if funds are available to enable them to support themselves, and sometimes their families, while engaged in such study.

The investigators in the study discussed above concluded that money was the key to moderating shortfalls in doctoral starts. Every (doctoral recipient) interviewee with a good source of support praised their benefactors and noted that they could not have completed their degrees without them and the support they provided.

Every (doctoral recipient) interviewee with meager, or no support, noted that on many, many occasions the road looked so dark, they almost abandoned pursuit of the degree.

We can expect a return to "normalcy" in the demographics of graduate degree production sometime in the first quarter of the next century if - and one must emphasize if - birth rates for the next few years return to "normalcy." Dr. Cirasa-Parish will present graphs predicated on the fact that doctoral starts surface 27 or so years after a cohort is born and master's starts 23 years or so after cohort births. Under "normal" circumstances this would mean plenty of master's starts in 2016 and plenty of doctoral starts in 2020. Again we must emphasize "if." To assume "normalcy" in starts in 2016 and 2020 is also to assume "normalcy" in cohort size lagged 23 or 27 years. Or "normalcy" in size of birth cohorts in 1993 and 1994. Because of the economic downturn, the latter may not occur and neither might the former. The total relationships of lagged birth cohorts to population sizes some years hence is graphically shown by an Appendix figure and table of birth cohorts. It can be seen that smaller than normal representation in any cohort cluster, in any year, can be traced to low birth cohorts lagged by that number of

years. The graph also indicates the phenomenon related to the shortfalls in births, e.g., epidemics, wars, depressions et al. The graph and table of cohort sizes span the period 1921-1986.

Birth cohort sizes are very sensitive to economic conditions. They fall when economies are bad. Richard Easterlin discusses this in depth in his Birth and Fortune (Easterlin, 1980). The phenomenon has been in evidence in every economic downturn since 1918. It is evidence today. Census Bureau officials have revised downward their estimates of births for 1993. Further, they have reported overestimations for the rates for 1992.

Easterlin refers to this phenomenon as the Life Chance Theory. Young people facing an uncertain economic future postpone both marriage and child bearing and birth cohorts are smaller. On the other hand, their children are more apt to face a brighter future - if the economy is stable - because their smaller numbers mean less competition. These children, in turn, see good times. They marry and form families sooner. They also have more children. All of this results in crowding, intense competition in the workforce, and a gloomy outlook for life chances on the part of many of their children. The results: later marriage and small families.

Since Life Chance Theory involves a demographic cycle which is driven by economics, educational institutions are powerless to affect the cycle. Instead they must adjust to it, not unlike producers and retailers adjust to market shifts. In the case of graduate student starts, they must adjust in the same way they adjusted

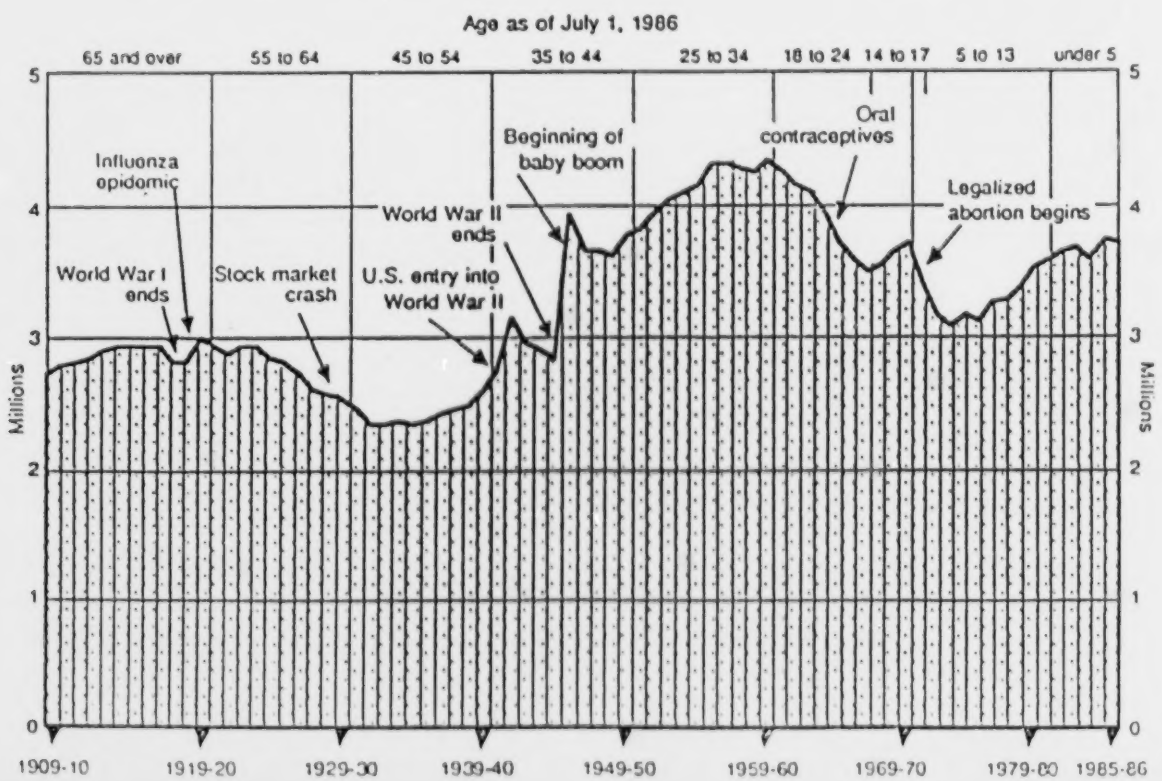
a decade ago to demographic shifts affecting undergraduate student starts, their freshmen students. In adjusting, they tapped new markets, e.g., older students, minority students, women students. In adjusting, they also mounted highly effective retention initiatives. What is suggested here is that these same markets must be tapped at the graduate school level, although some of the packaging might be different, e.g., corporate workers, military personnel et al. What is also suggested here is that retention efforts aimed at freshmen can be, and must be modified to retain more graduate students. Our experiences with undergraduates taught us both the necessity and the know-how to study and adjust to demographic cycles, There is no reason at all that we can't do the same for graduate education. Attitudes of some professors toward working with older, minority and women students must be altered, but this also can and will happen. White males in their 20s will simply be in short supply in 2000, having dropped from 42 to less than 30 percent of the total population of these cohorts. When availed of this fact, professors will adjust.

APPENDIX

Birth Cohorts and Affecting Factors 1921-1986

Year	Births	Year	Births	Year	Births	Year	Births
1921	3055	1938	2287	1955	4104	1972	3256
1922	2882	1939	2266	1956	4218	1973	3136
1923	2910	1940	2360	1957	4307	1974	3159
1924	2929	1941	2513	1958	4250	1975	3144
1925	2909	1942	2809	1959	4298	1976	3167
1926	2839	1943	2935	1960	4258	1977	3326
1927	2802	1944	2795	1961	4268	1978	3333
1928	2674	1945	2735	1962	4167	1979	3473
1929	2582	1946	3289	1963	4098	1980	3598
1930	2618	1947	3700	1964	4027	1981	3646
1931	2506	1948	3535	1965	3760	1982	3680
1932	2440	1949	3586	1966	3606	1983	3639
1933	2307	1950	3554	1967	3521	1984	3697
1934	2396	1951	3751	1968	3502	1985	3710
1935	2377	1952	3847	1969	3571	1986	3713
1936	2155	1953	3965	1970	3718	0000	0000
1937	2145	1954	4078	1971	3559	0000	0000

Source: U.S. Public Health Service, Vital Statistics of the U.S. , Annual Reports, 1921-86.



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